MINERALOGY AND PETROGRAPHY.[1]

Description of the New Rock Type, Malchite.—The new rock, malchite, referred[2] to a few months ago as the granitic dyke form of diorite, is now described in some detail by its discoverer, Osann.[3] It forms dykes cutting granite in the Odenwald, Germany. In a dense groundmass are rare phenocrysts of dark mica, pale green plagioclase and quartz. The mica is biotite and the plagioclase labradorite. In addition to these the microscope reveals the presence of idiomorphic green hornblende, allanite and sphene. The groundmass in which these lie strongly resembles that of some tinguaites, with hornblende and quartz in place of aegerine and nepheline. It consists of a fine granular aggregate of feldspar and quartz, the latter with occasional idiomorphic contours, and prisms of hornblende imbedded in the aggregate, the prisms often arranged in flowage lines. An analysis of a fresh specimen of the rock yielded:

SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	H_2O	SO_4	P_2O_5	Total
63.18	17.03	.24	6.37	.92	4.17	4.44	2.91	.52	.19	.23	=100.20

The Petrography of Hokkaido, Japan.—In a general geological sketch of Hokkaido, (Jezo or Yesso), Japan, Jimbo[4] declares that the island consists largely of paleozoic beds, probably underlain by amphibolites and various other schists, and cut by granite, diorite, gabbro, peridotite, and serpentine. In the lower portion of the paleozoic the beds consist largely of pyroxenites, with traces of radiolarian remains, phyllites, quartz-schists, limestone, and serpentine. The pyroxenites are aggregates of light colored augite, quartz and feldspar, in which the augite is often more or less changed to epidote and glaucophane. Where the granite cuts the clastics the clay slate is changed by contact action to a biotitic clay slate, to hornfels and to mica schist, with the latter nearest the eruptive. Tourmaline occurs in the schist and cordierite in this rock and in the mica slate. An amphibolite in the contact belt is supposed to be an altered tufa. Schistose granites, diorites and gabbro are phases of the corresponding

[1]Edited by Dr. W. S. Bayley, Colby University, Waterville, Me.

[2]AMERICAN NATURALIST, May, 1892, p. 422.

[3]Mitth. Gross. Bad. geol., Landesanst ii, p. 380.

[4]General Geological sketch of Hokkaido, with special reference to the petrography. Satporo, Hokkaido, Japan, 1892.

massive rocks associated with the contact products. Diabases occur as sheets in the unaltered paleozoic beds, and serpentines derived from gabbros and from dunites are met with cutting these at various localities. In addition to paleozoic there are also tertiary rocks on the island, and these are cut by their own systems of dykes and bosses, and are interbedded with characteristic sheets of lava, and layers of tufas. The tertiary volcanic rocks are pyroxene and hornblende andesites, propylites and rhyolites. The pyroxene andesites contain both orthorhombic and monoclinic pyroxenes and occasionally some olivine. They have also a glassy base which sometimes becomes so abundant as to resemble pumice. The hornblende andesite is strongly porphyritic with large phenocrysts of hornblende. The rhyolites are both compact and glassy, in which latter case they are vesicular.

Two Peculiar Rocks from Siberia.—Two very remarkable rocks are described by von Chrustschoff[5] from Taimyr-Land, Siberia. One is an ophitic aggregate of anorthoclase and nosean, containing as accessories sanidine, plagioclase, amphibole, biotite, melanite, magnetite, sphene, zircon and glass. The anorthoclase is in long, narrow crystals of the following composition:

SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	K_2O	Na_2O	Total
64.59	19.84	2.24	1.26	.63	3.53	7.88	=99.97

Corresponding to Or_2, Ab_6, An_1. The feldspar is usually idiomorphic with respect to the nosean, whose period of formation was between that of the biotite and that of the hornblende. The nosean is in very large quantity. Its density is 2.266 and composition:

SiO_2	Al_2O_3	Fe_2O_3	Na_2O	K_2O	CaO	H_2O	Cl	SO_3	Total
37.83	26.59	.38	22.40	1.63	.54	.87	1.66	8.68	= 99.98

The zircon is of the trachytic type, and is the only accessory of any importance. The author calls the rock taimyrite. The second rock is composed of anorthoclase, sanidine, biotite, and amphibole as essential components, and the other minerals mentioned above in connection with taimyrite as accessories, except that sodalite here replaces nosean. The zircon is of the granitic type, and the rock possesses the granitic texture.

[5]Bull. d. l'Acad. Imp. des Sciences St. Petersb. Mél. Geol. et Paleont., i, p. 153.

An Ottrelite Bearing Conglomerate in Vermont.—It is not uncommon to find ottrelite forming 25% of the schistose groundmass of the conglomerate[6] at the base of the Lower Cambrian, near Rutland, Vermont. The same mineral occurs along shear planes in a blue quartzite and constitutes 40% of a massive bed of the conglomerate. In the last named rock the ottrelite is in rudely circular areas, lying in a dark colored quartz. The areas consist usually of radiating plates of the mineral, disposed in a single plane. Its commonest inclusions are quartz and feldspar, while sericite often forms the centers of the radiating bundles. In the latter case the ottrelite is oriented in parallel position with the mica. Other inclusions within the ottrelite besides those above mentioned are crystals of zircon and rutile, flakes of graphite and plates of ilmenite. In other cases the ottrelite is in plates including large areas of the groundmass of the rock, which is a granulated mixture of quartz and albite (?) in about equal proportions, a large quantity of sericite, and some biotite. In this groundmass associated with rutile are crystals and plates of anatase. No traces of its original clastic structure remain in the rock, though its conglomeratic character is beyond dispute.

Lithophysæ in the Rocche-Rosse.—In parts of the Rocche-Rosse lava stream of Monte Pelato, Lipari, are spherulites with lithophysal characteristics. In some specimens examined by Cole and Butler[7] the spherulitic growth originated about the walls of steam vesicles, and progressed outward into the rock; in other cases they grew inward until they have completely filled the space that was formerly vacant. The importance of the paper lies in the fact that it acknowledges the correctness of many of Idding's views with respect to the formation of lithophysæ, and contradicts the view that regards all hollow lithophysæ as the result of the decomposition of spherulites.

The Composition of the Dune Sands of the Netherlands.—A very elaborate paper by Retgers[8] on the constitution of sand composing the dunes on the west coast of Holland at Sheveningen, near the Hague, contains a large amount of information concerning the character of sands and the method of determining the nature of their constituents. The author carefully fractioned large quantities of the dune sand by the ordinary methods of fractional precipitation in

[6]C. L. Whittle, Amer. Jour. Sci., Oct., 1892, p. 270.

[7]Quart. Jour. Geol. Soc., xlviii, 1892, p. 438.

[8]Recueil des Travaux Chimiques des Pays-Bas., xi, 1892, p. 169.

the usual heavy liquids and by means of the molten substances suggested by himself[9] for this purpose a few years ago, thus obtaining mixtures of mineral grains of about the same density. These then were studied carefully by comparison of their indices of refraction, by immersing them in liquids of known optical densities, until one was found in which the grains became almost invisible. The index of refraction of these is nearly that of the liquid, consequently their nature is thus approximately determined. Microchemical tests and the ease with which cleavage laminæ were produced, served to distinguish accurately between minerals having nearly the same refractive index. The principal minerals identified by the author are orthoclase, quartz, microline, plagioclase, cordierite, calcite, apatite, amphibole, tourmaline, pyroxene, epidote, sphene, sillimanite, olivine, garnet, staurolite, disthene, corundum, spinel, rutile, zircon, magnetite and ilmenite. The surprising discoveries are those of cordierite, calcite and olivine, and of glaucophane among the amphiboles. The proportions of the various minerals present according to specific gravity was 2.5% between 2.5 and 2.6; 85% between 2.6 and 2.7; 7.5% between 2.7 and 3. ; 1.5% between 3 and 3.3; 1% between 3.3 and 3.6; 2.4% between 3.6 and 4.2; .1% between 4.2 and 5.2. The sands are supposed to have come mainly from the rocks of archean terraces.

Quartz-Gabbro in Maryland.—In the Baltimore gabbro area, according to Grant,[10] are quartz gabbros consisting of bytownnite, quartz, hypersthene, secondary hornblende, and a few accessories. The quartz is limpid, and is almost free from inclusions, except for lines of small liquid cavities that traverse the grains, as is usual in granitic quartz. Diallage, which is so common in the normal gabbro of the region, is entirely absent from the quartz-bearing phases, which thus becomes a quartz norite.

Minerals from the Diamond Fields of Brazil.—Hussak[11] describes the characteristics of crystals of brookite, cassiterite and xenotime from the diamond region of Dattas, Minas Geraes, Brazil. On *brookite* from the sands of Diamantina was found the new pyramid, $\frac{1}{2}P\breve{2}$. The *cassiterite* is from Manquinho, near São Paulo. It occurs in a rubellite-bearing lepidolite granite. The *xenotime* accompanies the brookite in the sands of Dattas. On one doubly terminated crys-

[9]Cf., AMER. NATURALIST, 1890, p. 175.

[10]Johns Hopkins Univ. Circ. No. 103.

[11]Min. u. Petrog., Mitth. xii, p. 455.

tal were found the two new pyramids $\frac{4}{7}$P and $\frac{1}{3}$P. The axial ratio of these crystals is 1 : .61775. The author has also made a crystallographic examination of the *monazite* occurring so abundantly in the Brazilian granites and gneisses. The crystals of this substance are always tabular parallel to $\infty P\bar{\infty}$. They contain the same forms as do the Ilmengebirge crystals, but are never twinned. Upon washing a portion of sand from Bohia a 3 mm. long crystal of *euclase* was obtained whose density is 3.1. It is very rich in planes, being possessed of not less than three prisms, six clinodomes and three negative pyramids, beside the clinopinacoid.

Mineralogical Notes.—*Christianite* crystals are reported by Gonnard[12] as lining geode cavities in the basalts of dykes at Queyrières and Fay le Froid, Haute Loire, France. In the latter case the christianite groups enclose many crystals of augite. The trachyte of Montcharet, occurring as a dyke in granite, is cut by fissures whose walls are lined by *chabasite.*[13] The cubic faces of *galena* crystals implanted in druses of quartz at Pontgibaud are roughened by little cavities whose walls have the positions of octahedral planes. The phenomenon is regarded by Gonnard[14] as the result of corrosion. The same author mentions the existence of large crystals of *beryl* in the granites of Droiturier, near La Palisse, Allier, *psilomelane* in mammillary forms at Croix Moraud, Mt. Doré, and cubic pseudomorphs of *quartz* after some unknown mineral, probably fluorite, in the vicinity of d'Aubenas, Ardèche.

Three specimens of *melilite* from Mt. Somma, with densities of 2.917, 2.932 and 2.945 respectively, were powdered, purified, and analyzed by Bodländer[15] with this result:

SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	K_2O	Na_2O	H_2O	Total
41.34	10.37	4.29	33.84	5.79	1.13	3.45	.08	= 100.29

The author combats the view of Vogt that melilite is an isomorphous mixture of the gehlenite and akermanite molecules. He thinks that the negative variety is an admixture of $R''SiO_3$ and the aluminate R'''_2O_4R'', while the positive variety is a compound of the same silicate with the aluminate $R_2'''O_6R_3''$. Intermediate varieties are isomorphous mixtures of these.

[12]Bull. Soc. Franç d. Min., 1892, xv, p. 28.
[13]Ib., p. 31.
[14]Ib., p. 34.
[15]Neues. Jahrb. f. Min., etc., 1893, i, p. 15.

Moses[16] records the analysis of a granular *nickel arsenide* associated with native silver and siderite in a mine 18 miles west of Silver City, N. Mex. The silver is imbedded in arborescent forms in the brittle gray nickel ore, and this in turn is in a gangue of siderite. The analysis made on impure substance gave:

SiO_2	Pb	Ag	As	Ni	Co	Fe	Total
4.56	tr.	8.38	67.37	11.12	5.13	2.64	= 99.20

Regarding the SiO_2 and Ag as impurities the composition takes a form that may be represented by RAs_3 in which R = $\frac{4}{7}$ Ni $\frac{2}{7}$ Co and $\frac{1}{7}$ Fe, corresponding to a *nickel skutterudite.*

On crystals of topaz from the Province of Omi and from the tin mines of Yenagari Mino, Japan, Matthew[17] finds four pyramids, seven prisms, one of which, $\infty P\frac{11}{4}$, is new, the three pinacoids, three brachydomes and two macrodomes.

Optical Anomalies.—After an exceedingly careful examination of many sections of appophyllite crystals and a comparison of the phenomena they present with those presented by combinations of thin biaxial plates placed one upon the other, Klein[18] concludes that the mineral in its geometrically tetragonal crystals is an intimate mixture of optically positive and optically negative triclinic lamellæ. The positive constituent seems to differ from the negative element in containing no crystal water, since upon heating the positive component appears to increase in quantity. Negative appophyllite becomes positive upon loss of $4\frac{1}{2}$ molecules of crystal water. The investigation is a beautiful piece of accurate optical work.

In a reply to Mallard's[19] remarks on the black garnet pyrenaite Brauns[20] states that the structure described by the first mentioned anthor is exactly what should be expected of a dodecahedral substance under strain, and that the peculiarities of this garnet's optical properties may be easily explained on the Klein-Brauns theory of strain.

Upon soaking in oil sections of zeolites that have been rendered cloudy by loss of water, they again become sufficiently transparent for the study of their optical properties. Rinne[21] has taken advantage of

[16]School of Mines Quart., xiv, No. i, p. 49.
[17]Ib., xiv, No. 1, p. 53.
[18]Neues. Jahrb. f. Min., etc., 1892, II, p. 165.
[19]AMERICAN NATURALIST, Oct., 1892, p. 849.
[20]Neues. Jahrb. f. Min., etc., 1892, I, p. 217.
[21]Ref. Neues. Jahrb. f. Min., etc., 1892, II, p. 237.

this phenomenon and has carefully examined a number of the members of the group with a view to learning something of the changes effected in them by the loss of water. *Natrolite* appears monoclinic under these conditions, *scolecite* orthorhombic, *stilbite* orthorhombic, and each of the other zeolites affords a corresponding meta-zeolite. The optical anomalies often observed in these minerals is thought to be undoubtedly due to partial loss of water.

Isomorphism.—After a long mathematical discussion of the theory of the structure of isomorphous mixtures and upon comparison of the results of investigations upon the optical properties of mixed crystals, Poeckel[22] concludes that we have not yet sufficient data to decide as to whether Mallard's lamellæ theory of the constitution of these bodies is correct or not.

By the use of the method[23] in which colored and colorless crystals of supposed isomorphous substances are allowed to form under the microscope Retgers[24] has proven that the alkaline ferrates are isomorphous with the corresponding sulphates, selenates, molybdates and tungstates, that the potassium tellurates and osmiates are isodimorphous, and that the rutheniate of this metal is isomorphous with its uranate.

The arguments for and against the view as to the isomorphism of calcite and dolomite are given respectively by Brauns and Retgers[25] in a recent letter to the Neues, Jahrbuch. The discussion is too involved to warrant an intelligible abstract in these notes.

Etched Figures.—The matrix of the African diamonds is capable of resorbing[26] *diamonds,* producing on their faces irregular, long, and hemispherical hollows, associated with which are little spheres and grains of black carbonaceous substance, supposed to be a compound of iron and carbon.

Hofer[27] describes corrosian forms on the *calcites* of Steierdorf, Banat, and of Rauris and Salzburg, and ascribes the hexoctahedral faces $^{2}/_{5}^{4}O2$ on the *fluorite* of Sarnthal, Tyrol, to corrosive processes.

[22]Neues. Jahrb. f. Min., etc., B. B., viii, 1892, p. 117.

[23]AMERICAN NATURALIST, June, 1892, p. 517.

[24]Zeits. f. Physik. Chem., x, 5, 1892, p. 529.

[25]Neues. Jahrb. f. Min., etc., 1892, II, p. 210.

[26]Ber. deutsch. chem. Ges., 1892, p. 2470.

[27]Min. u. Petrog., Mitth. xii, p. 487.

Microchemical Reactions.—The methods of testing for traces of ammonia under the microscope, and of precipitating metals with H_2S are described in a few words by Streng.[28]

Directions for the detection of the following minerals in small particles are given by Lemberg:[29] *Scapolite, hauyne, sodalite, eudialite, lazurite, sulphur, olivenite, celestite and melilite.*

Miscellaneous.—Under the title "Rapid Qualitative Examination of Mineral Substances," Moses and Wells[30] publish a scheme for the detection of minerals. The blowpipe method is used with the metallic minerals, but in the silicate group a mixture of the dry and wet methods is made use of. From a hasty reading of the scheme it seems to be a practicable and convenient one.

[28]Neues. Jahrb., 1893, I, p. 49.

[29]Zeits. d. deutsch. geol. Ges., 1892, p. 224.

[30]School of Mines Quart., Nov., 1892, p. 25.